BIOMETRIC CHALLENGES IN FISHERIES RESEARCH

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Abstract

The Fisheries Resources Research Institute **(FIRRI)** is one of the research institutes under the National Agricultural Research organisation **(NARO).** The mandate areas of FIRRI include: capture fisheries, Fishing technology, Fish production processes, aquatic environmental health, aquaculture, post harvest processes and socio - economics of the fishing industry.
In order to contribute to the provision of reliable information, FIRRI employs 22 well-qualified research scientists (Ph.D., Masters) and a few part time staff in the various fields. However, the bulk of FIRRI's staff have little or no statistical training background which has led to the production of fisheries reports and information sometimes of questionable accuracy and quality.

The biometry challenges facing fisheries research can be classified into primary and secondary factors. Primary challenges have more to do with the nature of activities governing the fishery, fishing practices, fishing gears (nets etc) and people while secondary challenges in fisheries research have got to do with data collection, handling and processing.

To the above can be added the complex nature of the fish habitat (water). The fact that fish live under makes it hard to obtain reliable estimates of the true parameters of the fish population we cannot directly observe.

This paper analyses the Biometric challenges in fisheries research from a cross section of activities in the core research areas, annual reports, technical reports, dissertations and field visits and provides insight into the development of possible remedies to the various challenges.

INTRODUCTION

Research and technology development is one of the avenues through which the core national development objective of poverty eradication can be achieved. However, one of the major problems facing fisheries research is the lack of sufficient statistical training background amongst most of the fisheries research scientists.

In conducting research, knowledge of data is necessary. Some research activities are not possible because the appropriate data are either unavailable or not feasible. Data are therefore necessary to test concepts or theories empirically to estimate parameters within relationships and to establish the applicability of relationships and systems of relationships. The major aim of biometry in fisheries research is to provide statistical insight into the fisheries field and thus make inferences on the fishery characteristics from biological observations.

Here below are some of the primary and secondary challenges elaborated.

Primary challenges arise from the fisheries activities and the various stakeholders of the fisheries sector. For example in capture fisheries, it may be quite difficult to ascertain whether a boat is actually used for fishing or transportation of people. Reliable information is also very hard to obtain on such aspects as: the number of fishermen per boat (paid or not) and the share of the catch, boat ownership, number of boats owned, gear type and size used. In catch assessment fishing depth is just estimated (implying that there are no clear demarcations as to whether an area is inshore or offshore), understating of fish catches and values of the respective species caught could also occur.

In socio economics research, correct information on marital status, occupation, prices, savings, expenditure, remuneration, credit investment costs in processing, ownership and property rights and fishing practices is hard to obtain. Much as information on some of the sensitive socio economic and demographic characteristics can be obtained indirectly on realisation that the respondents are hesitant to give these details there is an apparent need to fishing industry stakeholders on the need for proper documentation.

Secondary challenges in fisheries research are as a result of inadequacies in data collection, handling and processing and these include:

Lack of congruence in the flow of funds and research and nature has sometimes led to inconsistency in the scheduling of field visits and scientific experiments to enable the generation of time series data. For example you could plan to carry out some activities in a rainy season that later turns out to be a very dry and hot season or you could go to the lake expecting it to be calm but turns windy.

So much data has been collected over time and has up to today not been entered into computers or even analysed to the extent that no inferences have been made out of it. In addition to this, raw data handling is so poor to the extent that some is recorded on unfastened paper some of which are now missing implying that some of the data that was collected may be rendered useless since it has many gaps. This calls for the use of well bound field visit forms (books) so as to avoid the unnecessary loss of data.

Data processing facilities are lacking. There is therefore need to standardize and ensure compatibility between the old and new software versions in use. The aim of this would be to provide information in the shortest possible time, which will be used to improve management of the fish resources so that local communities increase their benefits from the fishery while sustaining the ecosystem from which the benefits arise.

Some of the research scientists do not seem to be aware of whether they are using replication in their experiments or not and the subsequent handling of data from experiments involving replication. There is therefore need to select, design and understand the methods and procedures employed in research so as to both achieve the research objectives and produce reliable knowledge.

As far as sampling is concerned, it is normally difficult of impossible to take measurements on all the fish caught either because of time or resource constraints, which calls for sub-sampling. It is therefore necessary to know clearly how the sub sampling should be done to ensure proper representation of

the sample extracted from the lake from which inferences about the population can be made.

To these can be added the fact that since fish live under water, it is difficult to make inferences about aspects of fish life we cannot directly observe. This implies that you can never be sure of whether you are sampling correctly and if the samples so obtained are truly representative of whatever is being investigated.

The major aim of biometry in fisheries research is to provide statistical insight into the design of experiments, methods and procedures, analysis and dissemination of research results in the fisheries field. This aids in the making of correct inferences on the fishery characteristics from biological observations. These can be from the levels construction of socio economic and demographic indices, number of landing sites to quantities of fish caught among others.

FISHERIES RESEARCH IN UGANDA

In Uganda, fisheries development is one of the ways through which the government objective of poverty eradication is supposed to be achieved. This is because fisheries resources constitute one of the key national assets.
Up to 18% of the country is covered by lakes, rivers and streams with a potential to produce up to 250,000 metric tones of fish annually. Uganda also has vast aquaculture potential, which is still not adequately tapped.
The fisheries sector is a major foreign exchange earner, most affordable source of protein, contributes approximately 3% to GDP and employs about 1 million people

The overall developmental objective of the fisheries sector is to ensure that there is increased and sustainable fish production. This is to be achieved through sustainable management of capture fisheries and development of aquaculture.
However, fish statistics show that the supply of fish from the lakes is not sustainable. Total fish production has been declining since the maximum level of 245,000 metric tones recorded in 1989 and the trend is poised to continue. In

addition to declining catches, there has been a reduction in species diversity. The decline in production has been attributed to overfishing, destructive fishing methods and gears, introduction of exotic species and reduced productivity of the lakes caused by environmental degradation. The main reasons for low aquaculture production and slow development can be attributed to inadequate production and supply of quality fish seed, inappropriate feeding and pond management practices, inaccessibility of appropriate aquaculture production technologies to farmers, limited choice of farmed fish species and lack of reliable aquaculture information for planning and monitoring.

If the above constraints are not addressed in time, decline in fish production will continue resulting in increased malnutrition due to reduced availability of animal protein especially in the rural areas, reduced foreign exchange earnings for the country and loss of employment and income.

APPLICATION OF FISHERIES RESEARCH

Fisheries Resources Research institute Undertakes research which is aimed at generating, packaging and disseminating scientific knowledge, to guide in:

- Sustainable management of the fish stocks
- Conservation of aquatic biodiversity
- Integrating lake productivity processes into fisheries management
- Prevention of pollution and Eutrophication of the aquatic environment
- Control of invasive weeds especially the Water Hyacinth
- Enhancement of aquaculture production
- Reduction of post harvest losses and ensuring fish quality
- Development of options for optimization of socio economic benefits from fisheries and co-management
- Development of policies, laws, and regulations for management of the fisheries and aquatic environment.

GENERATION OF FISHERIES RESEARCH

The mandate of agricultural research under Uganda National Council of Science and Technology **(UNCST)** was delegated to the National Agricultural Research Organisation **(NARO)** whose mandate is to undertake, promote and coordinate research for crops, livestock, fish and forestry and to ensure the dissemination and application of research results. NARO implements her mandate through nine institutions supported by a secretariat (NAROSEC) located at Entebbe.

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FIRRI has three research areas namely; Limnology and water environment, Capture Fisheries, and aquaculture. In order to contribute to the provision of reliable information, FIRRI employs well-qualified research scientists (water scientists, ecologists, fish biologists, and fish stock assessment scientists) at Ph.D. and Masters levels and a few part time staff in the various fields.

CONCLUSION:

There are many challenges still facing fisheries research in Uganda that have to be addressed in the shortest possible time to enable the generation of reliable information. Here below is an illustration showing some of the steps that have to be followed when planning and executing a research.

STEPS TO BE FOLLOWED WHEN PLANNING AND EXECUTING A RESEARCH